



**IRIG STANDARD 106-17**

**TELEMETRY STANDARDS**

**ABERDEEN TEST CENTER  
DUGWAY PROVING GROUND  
REAGAN TEST SITE  
REDSTONE TEST CENTER  
WHITE SANDS MISSILE RANGE  
YUMA PROVING GROUND**

**NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION  
NAVAL AIR WARFARE CENTER WEAPONS DIVISION  
NAVAL UNDERSEA WARFARE CENTER DIVISION, KEYPORT  
NAVAL UNDERSEA WARFARE CENTER DIVISION, NEWPORT  
PACIFIC MISSILE RANGE FACILITY**

**30TH SPACE WING  
45TH SPACE WING  
96TH TEST WING  
412TH TEST WING  
ARNOLD ENGINEERING DEVELOPMENT COMPLEX**

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

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**DOCUMENT 106-17**

**TELEMETRY STANDARDS**

**July 2017**

**Prepared by**

**TELEMETRY GROUP**

**Published by**

**Secretariat  
Range Commanders Council  
US Army White Sands Missile Range,  
New Mexico 88002-5110**

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### APPENDIXES

Beginning with RCC 106-17, the appendixes that were previously stand-alone documents are now integrated with the chapters that cover the same material. This does not include four appendixes that are retired but maintained for historical purposes; these four remain stand-alone files and are renamed as annexes. The following lists new locations for the appendixes.

Appendix A, Frequency Considerations for Telemetry	<a href="#">Chapter 2</a> , Appendix 2-A
Appendix B, Use Criteria for Frequency Division Multiplexing	<a href="#">Chapter 3</a> , Appendix 3-A
Appendix C, PCM Standards (Additional Information and Recommendations)	<a href="#">Chapter 4</a> , Appendix 4-A
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Appendix R, Low-Density Parity Check Code for Telemetry Systems	<a href="#">Chapter 2</a> , Appendix 2-D
Appendix S, Space-Time Coding for Telemetry Systems	<a href="#">Chapter 2</a> , Appendix 2-E

\* Changed

† New

## Changes in This Edition

This document is an updated version of and replaces Range Commanders Council (RCC) Document 106-15 (Part 1: Telemetry Standards [July 2015]). The RCC Telemetry Group (TG) made an extensive effort to produce a well-coordinated and useful document. The following is a summary of these efforts.

- a. Task TG-128: 2017 Updates to Digital Telemetry Recorder Standards  
OBJECTIVE/SCOPE: Update IRIG 106 Chapter 6, 9, 10 to include data recorder capabilities required by the RCC members. Update Test Method (118) and Handbook (123).
- b. Task TG-131: Define Interference Protection Criteria (IPC) for RF Telemetry Systems  
OBJECTIVE/SCOPE: Telemetry operations continue to be threatened by new sources of RF interference from services sharing the telemetry bands or operating in adjacent bands. The Telemetry Standards do not contain any guidance for determining appropriate levels of protection to ensure our systems will not be impacted by these sources of interference. This task seeks to define the process and criteria to be used for evaluating potential interference to Range telemetry receiving systems.
- c. Task TG-133: Updates to TMATS for 106-17  
OBJECTIVE/SCOPE: To enhance the content of the Telemetry Attributes Transfer Standard (TMATS) as needed to keep it current with the data standards in the remainder of 106.
- d. Task TG-139: Define PCM Clocking standards for 106-17  
OBJECTIVE/SCOPE: Define clocking standards for ground equipment that process chapter 4 NRZ-L PCM.
- e. Task TG-140: Update 106-17 Appendix N Transmitter and Receiver Commands  
OBJECTIVE/SCOPE: Update RCC Document IRIG 106, Appendix N to define additional transmitter commands required to be common at the MRTFBs to support real-time command and control of serial streaming telemetry (SST) transmitter characteristics. This task will also define TM receiver commands for interoperability.
- f. Task TG-141: Update IRIG 106 with Standards for Data Quality Metrics (DQM) and Data Quality Encapsulation (DQE) for use in Telemetry Receivers  
OBJECTIVE/SCOPE: Define a Data Quality Metric (DQM) that correlates with telemetry link Bit Error Performance (BEP) and also define a Data Quality Encapsulation (DQE) standard that defines how to transport DQM with the received telemetry data.
- g. Task TG-143: IRIG 106 Ch. 21-28 Publication  
OBJECTIVE/SCOPE:
  - (1) Incorporate group and industry comments.
  - (2) Publish Chapters 21 through 28 of IRIG 106
- h. Task TG-144: Update IRIG 106 Chapter 7.

**OBJECTIVE/SCOPE:** Update Chapter 7 and TMATS in chapter 9 to support defining a subset of the PCM minor frame for chapter 7 data. Make chapter 7 and appendix Q clearer on how to implement chapter 7 compliant systems.



## Preface

The TG of the RCC has prepared this document to foster the compatibility of telemetry transmitting, receiving, and signal processing equipment at the member ranges under the cognizance of the RCC. The range commanders highly recommend that telemetry equipment operated by the ranges and telemetry equipment used in programs that require range support conform to these standards.

These standards do not necessarily define the existing capability of any test range, but constitute a guide for the orderly implementation of telemetry systems for both ranges and range users. The scope of capabilities attainable with the utilization of these standards requires the careful consideration of tradeoffs. Guidance concerning these tradeoffs is provided in the text. The standards provide the necessary criteria on which to base equipment design and modification. The ultimate purpose is to ensure efficient spectrum utilization, interference-free operation, interoperability between ranges, and compatibility of range user equipment with the ranges.

This standard is complemented by a companion series: RCC Document 118, Test Methods for Telemetry Systems and Subsystems; RCC Document 119, Telemetry Applications Handbook; RCC Document 123, IRIG 106 Chapter 10 Programmers Handbook; and RCC Document 124, Telemetry Attributes Transfer Standard (TMATS) Handbook.

The policy of the TG is to update the telemetry standards and test methods documents as required to be consistent with advances in technology.

Please direct any questions to:

Secretariat, Range Commanders Council  
ATTN: CSTE-WS-RCC  
1510 Headquarters Avenue  
White Sands Missile Range, New Mexico 88002-5110  
Telephone: (575) 678-1107, DSN 258-1107  
E-mail: [usarmy.wsmr.atec.list.rcc@mail.mil](mailto:usarmy.wsmr.atec.list.rcc@mail.mil)

**\*\*\*\*\* NOTHING FOLLOWS \*\*\*\*\***